#### (12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

## (19) World Intellectual Property Organization

International Bureau



# 1 (1881) 5 (1885) 18 (1881) 5 (1881 5 (1881 5 (1881 5 (1881 5 (1881 5 (1881 5 (1881 5 (1881 5 (1881 5 (1881 5

(43) International Publication Date 17 February 2005 (17.02.2005)

**PCT** 

# (10) International Publication Number WO 2005/015049 A2

(51) International Patent Classification7:

F16F

(21) International Application Number:

PCT/US2004/025504

- (22) International Filing Date: 6 August 2004 (06.08.2004)
- (25) Filing Language:

English

(26) Publication Language:

English

(30) **Priority Data:** 60/492,918

6 August 2003 (06.08.2003) US

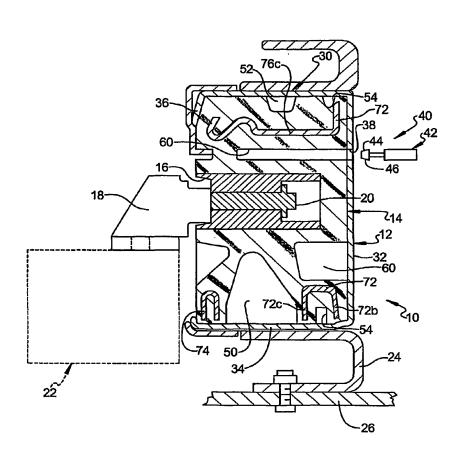
- (71) Applicant (for all designated States except US): FREUDENBERG-NOK GENERAL PARTNER-SHIP [US/US]; 47690 East Anchor Court, Plymouth, MI 48170-2455 (US).
- (72) Inventors; and
- (75) Inventors/Applicants (for US only): WIRGES, Todd [US/US]; 1511 Natalie Lane, Apt. 102, Ann Arbor, MI

48105 (US). **PRICE, Donald** [US/US]; 58535 Pontiac Trail, New Hudson, MI 48165 (US).

- (74) Agent: WANGEROW, Ronald; Freudenberg-NOK General Partnership, Intellectual Property Department, 47690 East Anchor Court, Plymouth, MI 48170-2455 (US).
- (81) Designated States (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.
- (84) Designated States (unless otherwise indicated, for every kind of regional protection available): ARIPO (BW, GH,

[Continued on next page]

(54) Title: SWITCHABLE HYDROBUSHING



(57) Abstract: A switchable hydraulic bushing (10)provided in which a secondary chamber (60) is sealed so as to be air-tight and is provided with a bleed passage (38) for allowing for the free flow of air into and out of the secondary air chamber (60). A closure device (40) is provided for closing off the bleed passage (38) for sealing off the air-tight secondary chamber (60) to alter the flexibility characteristics of the walls (58) of the compensation chambers (52) and effectively turn off the hydraulic damping function of the hydraulic bushing (10).

### WO 2005/015049 A2



GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PL, PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

#### **Declarations under Rule 4.17:**

— as to applicant's entitlement to apply for and be granted a patent (Rule 4.17(ii)) for the following designations AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, UZ, VC, VN, YU, ZA, ZM,

ZW, ARIPO patent (BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PL, PT, RO, SE, SI, SK, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG)

 as to the applicant's entitlement to claim the priority of the earlier application (Rule 4.17(iii)) for all designations

#### Published:

 without international search report and to be republished upon receipt of that report

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

## (19) World Intellectual Property **Organization**

International Bureau



## 

(43) International Publication Date 17 February 2005 (17.02.2005)

PCT

## (10) International Publication Number WO 2005/015049 A3

- (51) International Patent Classification7: F16F 13/00, 15/00, 5/00, 9/00, F16M 11/00, 5/00, 7/00, 9/00, B60G 11/22, F16F 1/36
- (21) International Application Number:

PCT/US2004/025504

- (22) International Filing Date: 6 August 2004 (06.08.2004)
- (25) Filing Language:

English

(26) Publication Language:

English

(30) Priority Data: 60/492,918

6 August 2003 (06.08.2003)

- (71) Applicant (for all designated States except US): FREUDENBERG-NOK **GENERAL** PARTNER-SHIP [US/US]; 47690 East Anchor Court, Plymouth, MI 48170-2455 (US).
- (72) Inventors; and
- (75) Inventors/Applicants (for US only): WIRGES, Todd [US/US]; 1511 Natalie Lane, Apt. 102, Ann Arbor, MI 48105 (US). PRICE, Donald [US/US]; 58535 Pontiac Trail, New Hudson, MI 48165 (US).
- (74) Agent: WANGEROW, Ronald; Freudenberg-NOK General Partnership, Intellectual Property Department, 47690 East Anchor Court, Plymouth, MI 48170-2455 (US).
- (81) Designated States (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NI, NO, NZ, OM, PG,  $PH,\,PL,\,PT,\,RO,\,RU,\,SC,\,SD,\,SE,\,SG,\,SK,\,SL,\,SY,\,TJ,\,TM,$ TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.

(84) Designated States (unless otherwise indicated, for every kind of regional protection available): ARIPO (BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PL, PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

#### **Declarations under Rule 4.17:**

- as to applicant's entitlement to apply for and be granted a patent (Rule 4.17(ii)) for the following designations AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, UZ, VC, VN, YU, ZA, ZM, ZW, ARIPO patent (BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PL, PT, RO, SE, SI, SK, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG)
- as to the applicant's entitlement to claim the priority of the earlier application (Rule 4.17(iii)) for all designations

#### Published:

- with international search report
- before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments
- (88) Date of publication of the international search report: 21 April 2005

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

(54) Title: SWITCHABLE HYDROBUSHING

(57) Abstract: A switchable hydraulic bushing (10) is provided in which a secondary chamber (60) is sealed so as to be air-tight and is provided with a bleed passage (38) for allowing for the free flow of air into and out of the secondary air chamber (60). A closure device (40) is provided for closing off the bleed passage (38) for sealing off the air-tight secondary chamber (60) to alter the flexibility characteristics of the walls (58) of the compensation chambers (52) and effectively turn off the hydraulic damping function of the hydraulic bushing (10).

